

Wave Summary One

Wave Types

Mechanical Waves – require a medium to travel, e.g. Sound.

Electromagnetic (EM) Waves – don't require a medium, travel in a vacuum, e.g. Light

Definitions and Symbols

Amplitude, A Maximum displacement from the equilibrium, related to the amount of energy the wave has.

Wavelength, λ length of one cycle.

Speed, v how fast the wave is moving.

Period, T time for one cycle to pass a point.

Frequency, f number of cycles that pass a point in a second.

Equilibrium undisturbed position of the medium.

Wavefronts One way to show waves moving is to draw lines representing the same part of a wave, usually crests. These lines are called wavefronts and can be used to show how a wave is moving, by adding an arrow to indicate direction of travel. Wavefronts are at right angles to the direction of travel. This way of showing waves is generally used with water waves.

Rays Another way of showing waves is to draw an arrow to indicate the direction the wave is travelling in. This depiction is generally used when light is being studied.

Phase a term used to describe the relative motion of two waves of the same frequency, usually measured as an angle. 0° means the motion is exactly the same and is called 'in phase'. 180° means the motion is exactly opposite and is called 'out of phase'. Can also be used to describe points on the same wave.

***Speed** It should be noted that wave speed is dependent upon properties of the medium the wave is in and independent of wave parameters. Even though the wave speed is calculated by multiplying wavelength by frequency, an alteration in wavelength does not affect wave speed. Rather, an alteration in wavelength affects the frequency in an inverse manner. A doubling of the wavelength results in a halving of the frequency; yet the wave speed is not changed.

Wave Equations

$$T = \frac{1}{f} \quad \text{and} \quad v = f\lambda$$